

500 STRUCTURES

ITEM 508 - FALSEWORK AND FORMS

508.01 Falsework

508.02 Forms

508.03 Oiling Forms

508.04 Payment

508.01 Falsework. Falsework shall be substantial and rigid and shall not unduly obstruct any waterway, highway or railway. Intermediate supports shall be arranged to produce in the completed structure the camber necessary for conformance with the plan profile of the roadway.

The maximum deflection "d", in inches (millimeters), in the longitudinal falsework members at the edges of the concrete deck shall not exceed 1/2 inch (13 mm) or the amount obtained by the following formula:

$$d = \frac{S + 100}{1000} \quad d = \frac{S + 2540}{1000}, \quad \text{in which } S, \text{ is the distance between}$$

supports in inches (millimeters). For transverse falsework members, and for longitudinal falsework members other than those near the edges of the deck, the permissible deflection as obtained from the above formula may be increased 75 percent. *If unusual requirements for spanning an existing road or channel or restrictions due to vertical clearance exist, a falsework with an excessive deflection may be approved by the Director.*

Camber shall be built into the falsework to compensate for falsework deflection. In addition, camber in the following amounts must be built into falsework to compensate for deflection of the slab after falsework is released.

- (a) Equal to 1/800th of the span for continuous spans.
- (b) Equal to $0.000018 S^3$ ($0.0161 S^3$) for simple spans, where S is the length of the slab in feet (meters) for camber expressed in inches (millimeters).

Also camber to conform to the vertical curvature of the profile grade must be provided. *If unusual requirements for span of an existing road or channel or restrictions due to vertical clearance exist, a falsework plan may be approved which exceeds the maximum deflection requirements providing it can be expected to perform properly.*

Where the falsework does not rest on rock, shale, or other firm foundation material, it shall be supported on piling driven to sufficient penetration to carry the superimposed loads, in accordance with 507, but not less than 8 tons (8 metric tons) per pile. Double hardwood wedges shall generally be used in connection with falsework or centering to facilitate vertical adjustment.

The Contractor shall remove and replace, at his own expense, any part of the structure made unsatisfactory by settlement or form deformation.

Falsework for arches shall be so constructed that it may be released gradually.

Falsework construction shall be removed before final acceptance of the structure. Falsework piling shall be cut off or pulled. If piles are cut off, they shall be cut at least to the slope line, rip rap line or bed of stream.

For all bridges over 20-foot (6.1 m) span whose main supporting members are cast-in-place concrete, falsework plans must be submitted and approved according to Section 501.06.

When a thickened edge is shown on the plans, it may be developed by sloping the bottom of the slab for a minimum of 9 feet (2.74 m) from the edge, in lieu of the section shown. This modification is at the Contractor's option, and additional concrete required shall be furnished at no cost to the City.

Falsework for structures shall remain in place until the concrete has met the requirements of 511.14.

Spandrel walls, decks of arches, sidewalks and curb, or any superimposed concrete to be completed after the main supporting member or the deck is constructed shall not be placed until the falsework has been removed or released.

For continuous concrete slab or beam superstructures the concrete shall not be placed on any span until the falsework and forms are complete for the adjacent spans. The falsework shall not be released or removed from any span until the concrete in adjacent spans has been placed a sufficient length of time to meet all requirements for the removal of falsework as set forth above.

508.02 Forms. All concrete shall be placed in proper forms. The use of the unprotected side of the excavation, instead of forms, will not be permitted, except as indicated in Section 503.05 for rock or hard shale excavation. For dry excavation described in Section 503.03, the sheeting may be used as forms for footings.

The forms shall be substantial, unyielding and mortar tight, and shall be so designed that the finished concrete will conform to the proper dimensions and contours. Forms for exposed surfaces shall be made of approved material requiring a minimum number of joints or dressed lumber of uniform thickness using a form liner of an approved type. Forms and form liners are to be used in a manner to reduce to a minimum the joints showing on the finished surface. Joints shall be arranged to coincide with any rustication grooves shown on the plans. Forms shall be properly braced or tied together with approved form ties so arranged that when forms are removed, no metal will be within 2 inches (51 mm) of an exposed surface of the finished structure. An approved insert shall be used in connection with all ties in the region of exposed surfaces. No material, except *reinforcing supports defined* in Section 509.09, shall be permitted to remain in the concrete.

For concrete decks separated by an open median *or temporary closure section*, the falsework and forms for each deck shall be independent of the adjacent structure or *remaining superstructure*.

Temporary openings shall be provided at the base of column and wall forms and in the bottom of all narrow, deep members where necessary to facilitate cleaning or inspection immediately before depositing concrete.

All exposed edges shall be beveled 3/4 inch (19 mm) with a triangular strip built into the forms.

Where rustication is used, the molding shall be fastened to the forms in such a manner that the molding will remain in the concrete when the forms are removed. Molding for rustication shall be surfaced on all sides. This molding shall not be removed until the concrete has set sufficiently so that the edges of the concrete will not be damaged.

If weep holes through abutments or retaining walls are called for on the plans or are required to provide outlets for backfill drainage, they shall be formed in such a manner as to obtain a smooth circular opening and straight gradient through the wall. They shall be between 3 and 4 inches (75 and 100 mm) in diameter, with a gradient of 0.08, spaced not closer than 6 foot (1.8 m) nor more than 10 foot (3.0 m) centers and placed so that the bottom of weep holes, at face of wall, is approximately 6 inches (150 mm) above ground line or low water elevation.

508.03 Oiling Forms. The inside of forms shall be coated with non-staining mineral oil or other approved material, prior to placing the reinforcing steel.

508.04 Payment. Falsework and forms will not be paid for separately, but their cost shall be included for payment in the price bid for the item for which they are used.